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Attorney Docket No. 2003P18697US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:	)	
Thilaka S. Sumanaweera, et al.	)	
Serial No. 10/806,875	)	Examiner: Ellsworth Weatherby
Filing Date: March 23, 2004	)	Group Art Unit No. 3768
For: ULTRASOUND BREATHING	)	Conf. No.: 3873
WAVEFORM DETECTION	)	
SYSTEM AND METHOD	)	

**REPLY BRIEF (37 CFR 41.41)**

Mail Stop: Appeal Brief – Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

By the filing of this Reply Brief in accordance with 37 CFR § 41.41, Appellants respectfully request reconsideration of the above-identified patent application by the Board of Patent Appeals and Interferences.

**Argument**

**1. Von Behren, et al. cannot preclude patentability based on 35 U.S.C. §103**

Claims 1-15 are allowable due to 35 U.S.C. §103(c). All of claims 1-15 were rejected pursuant to 35 U.S.C. §103(a) in reliance, at least in part, on Von Behren, et al. The present application was filed March 23, 2004. Von Behren, et al. was filed Nov. 14, 2003, but not published until May 19, 2005. The present application was filed before any

publication or issuance of Von Behren et al. Von Behren et al. is a 102(e) reference used for a 103(a) rejection.

Von Behren et al. is assigned to Siemens Medical Solutions USA, Inc (reel 014623 and frame 0105, executed 3/24/04 and 4/22/04). The present application is also assigned to Siemens Medical Solutions USA, Inc (reel 015135 and frame 0801, executed 3/19/04 and 3/22/04). The present application and Von Behren et al. were, at the time of invention of the present application, owned by or subject to an obligation to assign to Siemens Medical Solutions USA, Inc. Pursuant to 103(c)(1), claims 1-15 are allowable.

## **2. Movement is not used to identify a portion of a cycle**

Claim 16 is allowable. First, the Examiner misreads Jackson '660. Jackson '660 discloses estimation of cyclical motion associated with a cycle (col. 8, lines 7-9). The cyclical motion is estimated using triggering (col. 8, lines 7-9). However, the Examiner concludes that the calculation of a correlation value is a function of tracked motion (Examiner's Answer, page 17). This conclusion is the reverse of the teaching of Jackson '660. The correlation values are used to track the motion (col. 6, lines 57-65). The cited triggering may be a function of resulting motion estimates. Even if the col. 8, lines 7-9 teaching is read to be estimating motion based on previous estimates, the further estimated motion is not a correlation. Jackson '660 does not disclose calculating correlation values from tracked motion.

Second, movement is not used to identify a portion of a cycle. Given the Examiner's reading of Jackson '660, the cyclic parameter is movement associated with the cycle (col. 8, lines 7-9). In claim 16, the first portion of the cycle is identified from the cyclic parameter, so is identified from movement given the Examiner's reading.

The "first portion" may be any identified portion of the cycle. The Examiner attributes no patentable weight because any portion may be arbitrarily identified as the "first portion" (Examiner's Answer, page 17). However, claim 16 recites identification of the portion. Even though the portion may be a peak, zero-crossing, or location in-between (e.g., beginning, end, or portion in-between), the portion is to be identified. Claim 16 recites that the portion is to be identified as a function of the cyclic parameter.

Jackson 660 does not use movement to identify a portion of a cycle. At col. 4, lines 50-65, a region of interest position in an image is determined by correlating with data for the region of interest from another image. Col. 6, lines 57-62 teach making the same position estimate for subsequent images or frames of data. This correlating does not use a cyclic parameter. Identification of a position of a region of interest is not identification of a portion of a cycle (beginning, end, or anywhere in-between). As noted above, col. 8, lines 7-9 mention use of these motion estimates in triggering to estimate movement associated with a cycle. Estimating movement associated with a cycle does not identify a portion of the cycle. For example, the beginning, R-wave, or other portion of the cycle is not identified.

Jackson '017 do not use movement to identify a portion of a cycle. Jackson '017 plot the motion from correlation as a waveform over time (col. 6, lines 43-51). Waveforms from different cycles are fit together (col. 6, lines 52-56; col. 6, line 66-col. 7, line 5). The fit cycle waveforms allow interleaving of the frames of data representing the imaged region at different times from different cycles (col. 8, lines 9-22). Jackson '017 temporally align frames from different cycles to create a higher frame density for one representative cycle. Since only relative position is needed, waveforms are fit together. Such alignment and interleaving is done without identification of a portion of the cycle other than a beginning of the cycle (see col. 7, lines 15-17). The beginning of each cycle is determined from a trigger event (col. 7, lines 17-20). The trigger is based on a ECG R-wave (col. 8, lines 60-64; and col. 9, lines 11-16). Jackson '017 use motion to create a waveform for the cycle, but identify any portion of the cycle based on ECG triggering. Jackson '017, like Jackson '660, do not use movement to identify a portion of a cycle.

### **3. A trigger event is not a reference frame**

Claim 16 is allowable for another reason. Jackson '017 does not reset a reference frame. A trigger, such as an R-wave, marks the beginning of a new cycle (col. 7, lines 17-20; col. 8, lines 60-64; and col. 9, lines 11-16). A trigger or R-wave is not a reference frame. Frames acquired after the trigger event are acquired in response to the trigger and tagged as being a certain time after the trigger (col. 8, line 62-col. 9,

line 2). These frames are not references. Jackson '017 uses a reference trigger since the cycles are to be aligned. Jackson '017 does not reset a reference frame.

Jackson '017 separates different cycles to allow interleaving. Jackson '660 desire to track motion over time, so either keep one reference frame or continuously change the reference frame (col. 6, lines 42-56). The separation into cycles of Jackson '017 would not assist the ongoing region of interest tracking of Jackson '660. Switching the reference frame on a per cycle basis, even if taught by Jackson '017, would likely cause distracting jumps in the region of interest location and gradually result in misalignment of the region. A person of ordinary skill in the art would not have used the every cycle triggering of Jackson '017 with the tracking of Jackson '660.

#### **4. Morphing removes the cycle variation relied on by Jackson '660 and '017**

Claim 19 is allowable. The morphing of Jago, et al. would not be used with Jackson '660 or Jackson '017. Morphing is used to make spatial information in different images congruent or aligned to avoid blurring when combined (Jago, et al. col. 5, lines 18-21). The morphing positions the imaged structure at the same location in different images.

Jackson '660 motion tracks to shift the region of interest. If the morphing is performed, then the region of interest does not need to be shifted. A person of ordinary skill in the art would not use the morphing of Jago, et al. with the teaching of Jackson '660.

Jackson '017 relies on variation through a cycle for tracking to plot a waveform (col. 6, lines 43-51). If the morphing is performed, then the cycle information based on spatial change is lost. A person of ordinary skill in the art would not use the morphing of Jago, et al. with the teaching of Jackson '017.

Morphing removes the cycle variation information relied on by Jackson '660 and Jackson '017. A person of ordinary skill in the art would not have used the variation removing morphing of Jago, et al. with the cycle variation-based teachings of Jackson '660 and Jackson '017.

### Conclusion

In conclusion, Appellants respectfully submit that the rejections raised by the Examiner have been overcome for at least the reasons set forth above. Accordingly, reversal of all grounds of rejection is respectfully requested.

PLEASE MAIL CORRESPONDENCE TO:

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